A PRESSURE TURBINE

Area of the invention

This invention relates to the area of turbines in general and in particular to an improved all purpose turbine which can be driven by any gas or liquid acting on its propellers. In particular the invention relates to a more efficient turbine which maximises the energy transfer of the fluid to the turbine.

Background to the Invention

During the nineteenth century high speed waterwheels called turbines were invented. The same basic principles are used today. As water enters conventional flow-through turbines the water hits the turbine blades and drives the turbine.

It is now common for all manner of low viscosity fluids to be used to drive turbines and these fluids include gas and steam as well as water. The invention will however for convenience sake be discussed herein with reference to a water driven turbine although it is to be understood that it could be used for a wide range of applications from hydro-electricity generation down to much smaller applications.

As a fluid passes through a turbine there is a significant loss of energy in this process as turbines are of varying efficiency with respect to the transfer of energy to their blades and also act as an obstruction to the fluid flow. In fact the greater the number of blades and the poorer their efficiency, the more fluid flow will be impeded.

Outline of the Invention

It is an object of this invention to provide a turbine of a type which is pressure driven and utilises the energy obtained by effectively blocking fluid between adjacent blades of a turbine and avoids the energy loss of conventional turbines where a fluid flows past such blades.

The invention is a turbine having a housing containing a rotatable concentric inner member with a central shaft and a plurality of generally axially oriented blades extending between an exterior face of a peripheral wall of the inner member and an inner face of a peripheral wall of the housing, the space between said walls defining a channel into which a fluid may pass, the arrangement being such that a fluid may be directed through at least one inlet in the housing peripheral wall to act on a blade and fill the space between adjacent blades and thereby cause the inner member to rotate, the fluid leaving the turbine through an outlet in the housing peripheral wall.

It is preferred that there be a plurality of inlets in the housing peripheral wall. It is also preferred that the blades be dimensioned such that a fluid does not

effectively pass around them and that the volume between adjacent blades forms individual compartments.

It is further preferred that the exterior of the inner member be provided with a plurality of steps between adjacent blades to further reduce the volume of a compartment and to provide further surfaces upon which the fluid can impinge.

It is preferred that the inlet apertures pass diagonally through the body wall to direct the fluid towards the blades.

In order that the invention may be more readily understood we shall describe by way of non limiting example a particular embodiment of the invention with reference to the accompanying drawings.

Brief Description of the Drawing Figures

Fig. 1 Shows a diagrammatic representation of a preferred embodiment of the invention requiring minimal water usage;

Fig.2 Shows an exploded diagram of a second embodiment of the invention;

Fig. 3 Shows a cross section through the embodiment of the invention shown in Figure 2;

Description of Embodiments of the Invention

Although the preferred embodiment of the turbine 10 of the invention is shown

in Figure 1 the general structure of turbine will initially be discussed in terms of that shown in Figure 2.

As shown in Figures 2 and 3 the turbine has a housing 20 made up of components 21 and 22 for an inner rotating component 30which is attachable to a central shaft which is concentric with the housing. This inner component is an annular ring 35 compressed between two circular plates 31 and 32, this component being attached as shown to shaft 40.

On the outer face of the ring wall 36 are a number of small generally axially oriented blades 33 which when the turbine is assembled form a close fit in the housing 20 such that the volume between adjacent blades forms an individual compartment. There is however sufficient clearance for the assembly to rotate when water enters diagonally oriented inlets 60 in the housing and pressure is applied within each compartment.

The housing is also provided with an outlet 61 for the water to exit the device and in this manner resistance to flow of the water is minimised unlike the situation with flow-through turbines.

It can be seen in Figure 1 showing a preferred embodiment of the invention that individual compartments are created between adjacent blades and that the effect of water in each compartment is to cause the ring to rotate and consequently the shaft rotates.

In the embodiment shown seven inlets are provided and if water pressure is supplied through all of these the torque provided will be much greater than if perhaps only two inlets were provided. The precise number of inlets provided or used is not germane to the invention and it is envisaged that even if a plurality of inlets are provided means may also be provided for opening and closing these.

While the two embodiments of the invention described accord with the principles of the invention the embodiment shown in Figure 1 is preferred as the volume in any one compartment is greatly reduced by the provision of a series of overlapping thin blades providing a plurality of small steps inside each compartment upon which the entering water can impinge. By this means the volume of water required to drive the turbine may be reduced by, for example 99% so that a flow of 5250 litres per minute would be reduced to 35 litres per minute.

The arrangement is such that by controlling the step size the volume of water passing through the turbine can be varied as required.

Although it is envisaged that the turbine of the invention would be used for power generation, due to its vastly increased efficiency when compared with conventional flow-through turbines, it could be of any size and used in any application where a turbine is required and also driven by any fluid.

When considering generation of hydro-electricity, by use of the turbine of the invention either far fewer turbines are required to generate an amount of energy generated by conventional machines or much more energy can be generated by the same number of machines. Owing to the minimal bulk of the turbine of the invention many more such turbines could be accommodated in the space currently used by a conventional flow through turbine.

While we have described one embodiment of the invention here the turbine of the invention has many applications.

In another application of the invention the turbine is used to drive a car engine. In this case the turbine is supplied by a continuous flow of gas from a pressure vessel incorporating a pressure valve that will release the gases once they reach a certain level, several fuel and oxygen injectors, and a pressure sensor that will send its signal to a computer and will tell the fuel injectors to fire once the pressure in the vessel falls below the required level to turn the blades of the turbine.

The pressure vessel will be connected to the turbine via a pipe that connects the hot gases to a heat exchanger (water cooled radiator). This will deliver gases at a mild temperature compared to that produced by a conventional piston used in car engines.

Clearly the turbine of the invention has many applications and while we have

described herein two embodiments of the invention it is to be understood that variations and modifications in the materials used and the features described can still lie within the scope of the invention.